DOCUMENT RESUME

ED 470 199 IR 021 641

AUTHOR	Tzeng, Jeng-Yi
TITLE	Comparing Teachers' and Parents' Mental Models for Teaching Hearing-Impaired Children To Speak.
PUB DATE	2001-11-00
NOTE	12p.; In: Annual Proceedings of Selected Research and Development [and] Practice Papers Presented at the National Convention of the Association for Educational Communications and Technology (24th, Atlanta, GA, November 8-12, 2001). Volumes 1-2; see IR 021 504.
PUB TYPE	Reports - Evaluative (142) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Children; Cognitive Processes; *Comparative Analysis; *Disabilities; Elementary Secondary Education; Hearing Impairments; Individual Needs; Instructional Effectiveness; *Parents; *Teachers; Teaching Methods; *Teaching Models
IDENTIFIERS	*Mental Models

ABSTRACT

In order to understand the cognitive and affective roots underpinning the differences between teachers' and parents' teaching approaches for hearing-impaired children, this study proposes a four-level analysis structure (global-level schema, middle-level schema, local-level schema, and prepositional reasoning) to construct and then compare teachers' and parents' mental models for teaching. The outcomes of this comparison reveal many fundamentally different perceptions and attitudes about teaching between teachers and parents, which often result in ineffective communication between the two. Therefore, it is suggested that to improve the effectiveness of instruction between teachers and parents in special education, one needs to understand how teaching exceptional children is mentally represented before any intervention is designed. (Contains 23 references.) (Author/AEF)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 470 199

Comparing Teachers' and Parents' Mental Models for Teaching Hearing-Impaired Children to Speak

Jeng-Yi Tzeng

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

[] This document has been reproduced as received from the person or organization originating it.

[] Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

P. Harris

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

IR 021 641

BEST COPY AVAILABLE

Comparing Teachers' and Parents' Mental Models for Teaching Hearing-Impaired Children to Speak

Jeng-Yi Tzeng
Indiana University-Bloomington

Abstract

In order to understand the cognitive and affective roots underpinning the differences between teachers' and parents' teaching approaches for hearing-impaired children, this study proposes a four-level analysis structure (global-level schema, middle-level schema, local-level schema, and prepositional reasoning) to construct and then compare teachers' and parents' mental models for teaching. The outcomes of this comparison reveal many fundamentally different perceptions and attitudes about teaching between teachers and parents, which often result in ineffective communication between the two. Therefore, it is suggested that to improve the effectiveness of instruction between teachers and parents in special education, one needs to understand how teaching exceptional children is mentally represented before any intervention is designed.

Introduction

In special education, while teachers have the expertise of teaching children with special needs, parents, usually unprepared for such a daunting task, are the ones who execute the teaching tasks and help children to learn everyday. Therefore, it is a common practice for teachers to train parents to teach their children. However, the training's ineffectiveness often puzzles the teachers. It is a commonly shared feeling among teachers that teaching parents is more difficult than teaching children because it requires a lot more persuasion, reminding, and rectification to help parents to accept and to internalize the teaching approaches. Parents, on the other hand, often find it difficult to completely accept teachers' approaches. An important reason is that the disparity between being a parent and being a teacher to a child is often concomitant with different perceptions of teaching, which often results in different teaching styles. For example, parents have been observed to incline to provide more intense instruction (Rogoff, Ellis, & Gardner, 1984), to use more controlling and straightforward styles to manage children's activities, and to be more performance oriented (Wertsch, Miick, & Arns, 1984). Moreover, this disparity also exerts a significant impact on the extent to which parents identify themselves with teachers' teaching approaches. Apparently, when factors like parental expectations, responsibilities, relationship with the child, etc. are amalgamated with teaching, parents often develop a different view from teachers. Especially when the child requires special care, the effects of all these factors seem to be intensified; therefore, more divergent teaching styles are expectable. However, surprisingly few studies have been conducted to understand how differently teachers and parents think about teaching children, in particular, with special needs. As a result, questions such as "Why parents ignore teachers' advice?" and "Why teachers have trouble communicating a pedagogical notion to parents?" are left answered. In order to answer these questions, this study intends to delve into teachers' and parents' mental models to present and then to compare how the notions of teaching are internally represented in teachers' and parents' minds.

Mental Models

Although it has been widely adopted and studied by many researchers, there is no consensus of the definition of the term "mental models" (Hong & O'Neil, 1992). In general, the following features of mental models have been described in the literature:

First, mental model are internal representations that we construct in mind for the message or event that we encounter (Norman, 1983; Johnson-Laird, 1983). Such representations should be "essentially problem-oriented, not encyclopedic in nature, and are bound to be incomplete or underspecified" (Sanford & Moxey, 1999, p.74). That is, they present an analogous structure to the represented entities (Johnson-Laird, 1983; 1989) instead of an identical mirror image in our mind.

Second, mental models are explanatory constructs (Johnson-Laird, 1983). Once the internal representation has been created in our mind, it begins to influence the way we see, interact with, and reason about the world (Greeno, 1989; Dutke, 1996), and to make us experience events by proxy (Johnson-Laird, 1983, p. 397).

IR021641

Third, mental models have computational capabilities (Greeno, 1989; Wilson and Rutherford, 1989). Especially for discourse comprehension, such computational processes are often represented by propositional reasoning (Anderson, 1993; Johnson-Laird, 1983).

Finally, mental models are schema-based (Driscoll, 1994; Dutke, 1996; Rouse & Morris, 1986; Wilson & Rutherford, 1989; Johnson-Laird, 1983). Sanford and Moxey (1999) further argue that the notion of mental model would be void if it is not rooted in background knowledge.

What these features imply is that by mapping the perceived message or entities to our background knowledge, our mind constructs a prior-knowledge interpreted representation of the given message, which not only presents itself as the surrogate reality for the message in our mind, it also formulates the premises under which we reason and make inferences. Given the close link between mental models and schema, to complete the theoretical discussion of mental models, it is important to understand the construct of schema first.

Schema

Originally defined by Barlett (1932) as "an active organization of past reactions, or of past experiences, which must always be supposed to be operating in any well-adapted organic response" (p. 201), schemas have been described as unconscious mental structures (Brewer, 1987) that contain networks of "interrelations... hold among the constituents of concepts in question" (Rumelhart, 1980, p. 34). Essentially, according to Minsky (1975), it is a construct that organizes our prior knowledge in a hierarchical structure that contains networks of nodes and relations. While the top-level nodes are "fixed, and represent things that are always true about the supposed situation" (p. 212), the bottom-level nodes contain automatically assigned default values that stipulate the conditions that the incoming data have to meet in order to be accepted. These default values--the declarative knowledge represented by propositions --function as premises that rule our reasoning processes (Johnson-Laird, 1983). Based on these propositions, people reason in the format of if-then productions, which serve as the building block of human cognitive operations (Anderson, 1983; 1993). Those proposition-based declarative knowledge thus become the joints where the mental model theory dovetail with the schema theory and thus formulate the integrated internal representation through which we perceive and understand the world.

In this study, the integration of schema and mental models is presented by a four-level structure, i.e., global-level schema, middle-level schema, local-level schema, and proposition reasoning, as will be discussed below.

Methodology

All the data were collected in the Children's Hearing Foundation in Taiwan, a non-profit organization that provides free Auditory-Verbal therapy (Auditory-Verbal International, 1991) and audiology services for hearing-impaired children. To answer the question "Given the same aspiration of helping children to learn as effectively and efficiently as possible, and the same teaching strategy (Auditory-Verbal approach), why and how teachers and parents still teach differently?" purposive sampling was used to select and recruit parents on the basis of the following three criteria: (a) they must have attended the CHF's lessons for at least one year; (b) they must be the primary care-takers and committed to the task of teaching their children to speak; and (c) they accept and value the importance of the Auditory-Verbal approach. Three mothers and their corresponding teachers were invited to participate in the study. Information about these teachers, parents, and children is tabulated in Table 1.

Children & mothers	Joey & his mother	Kyle & his mother	Tony & his mother
Age (child /mother)	5 / mid 30	5.5 / mid 30	5 / mid 30
Siblings	Only child	Has a younger brother (also hearing impaired)	Has an elder sister (with normal hearing)
Mother's education	College	College	College
Years in the CHF	2 years and 9 months	1 year	1 years and 6 months
Child's hearing loss	Severe-to-profound / Cochlear Implant	Moderate-to-severe / Wearing hearing aids	Profound / Cochlear Implant
Corresponding teachers	Jill	Karen	Tina
Age	Late 20	Late 20	Late 30
Marriage	Single	Single	Mother to 2 boys
Years in the CHF	3 years	1 year and 6 months	1 years and 6 months
Time with the child	2 years and 9 months	1 years	6 months

Table 1. Background information of the three teachers, three mothers, and three children.

Data collection

After participants were recruited and before any data collection process began, the researcher spent two weeks in the foundation to get acquainted with participants in order to build a mutual trust. Over the span of three months, interviews, observations, and stimulated recalls (Bryan, Bay, Shelden, & Simon, 1990; Anthony, 1994; Clark & Peterson, 1986; Van Noord & Kagan, 1976) were conducted. All of the interviews and recalls were audiotaped, transcribed, and translated from Chinese to English. An external audit (Lincoln & Guba, 1985) was invited to ensure the accuracy of the transcriptions and translations.

Interviews: Two interviews for each participant were conducted: one at the beginning and one at the end of the data collection processes. The interviews were open-ended in nature to elicit a holistic picture of participants' perceptions of teaching.

Observations: For each teacher-parent pair, two therapy sessions at the CHF which contain representative episodes or interactions that evidenced certain thinking processes were videotaped and fully transcribed.

For each mother, two teaching sessions at home were videotaped and fully transcribed. To reduce the intrusion, the researcher and the video camera were far away from the teaching site as much as possible.

Stimulated Recall on Videotapes

After each videotaped session ended, the teachers (for the CHF sessions) and mothers (for CHF and home sessions) were asked to reflect on the videotape right after the sessions ended. The purpose of the stimulated recall was to (a) reconfirm the researcher's observations, (b) allow participants a chance to organize and reexamine what they thought and felt in the sessions, and (c) expose hidden messages that were otherwise not observable in the interactions.

Data analysis

In this study, two types of data were collected: (a) what people did, and (b) what people said. The fieldnoted videotape transcriptions were first broken down into different activity groups, e.g., reading a story. The constituent unit behaviors and their relations within each exchange of verbal or bodily language were first identified, coded, and represented by boxes and arrows. These intra-activity models are called micro-level interaction models. After all micro-level interaction models are completed, patterns of people's launching and reacting to an interaction across different teaching activities emerged. These emerged patterns are thus constructed into inter-activities models, called macro-level interaction models, in the format of flowcharts to represent people's knowledge of conducting a certain teaching procedure. Because this model concerns knowledge of procedures that are directly related to conducting a teaching activity, it constitutes the local-level of the schema of teaching.

After all the interview and recall data were transcribed and verified by the participants, they were first distilled into propositions. As the gradation of their relations to a specific teaching behavior emerged, these propositions were divided into three-level schema to represent the hierarchy of thoughts.

Global-level schema: composed of essential attributes (Wilson & Rutherford, 1989, p. 623) that represent prototype (Hampton, 1991; Medin, 1978) conceptualization of teaching that emerged from data as the quintessential notions of a typical thinking mode that formulates the central tendency of a person's conceptualizing a teaching task in a genuine yet context-free teaching scenario. In reference to Krathwohl's affective taxonomy (Krathwohl, Bloom, & Masia, 1964), this is analogous to the "generalized set".

Middle-level schema: composed of themes or beliefs that were repetitively voiced by the participants as the bottom-line principles that they hold on to as a guidance for reasoning or behaving toward a certain situation. This is corresponding to "commitment" in Krathwohl's affective taxonomy.

Local-level schema: composed of the network of context-bound and teaching-behavior-related propositions that represent the declarative knowledge (Anderson, 1983) of conducting a certain teaching procedure. This local-level schema from verbal data will be matched with the one from observation data (macro-level interaction models) on the basis of corresponding constituent behaviors so that the actions and the knowledge embedded in each action are integrated.

Propositional reasoning productions: as every teaching task-related proposition implies a goal to achieve, which is commonly derived from the global- and middle-level schema, propositions with the same goal are first grouped. The goal serves as the condition, the "if" part, of an if-then production (Anderson, 1993), and these propositions make the action, the "then" part (or counter-examples as pointed out by Johnson-Laird, 1983). These

constituent behavior based if-then productions therefore represent the underlying cognitive operations of each teaching behavior.

After analyzed with this framework, the teachers' and parents' mental models for teaching are compared and the most significant differences are presented as follow.

Results

Due to similar training and education backgrounds, a striking consistency was found among the three teachers' data. Therefore, these data were combined as one and compared to the three mothers' individual data on the basis of the four-level mental model framework. However, to avoid redundancy, at the three-level schemas, teachers' and the three mothers' models are compared at the same time; but to reveal the individual differences, the teachers' propositional reasoning models are compared with each of the three mothers' individually. The following are the outcomes of the comparison.

Comparison of Global-Level Schema

The teachers' and the three mothers' global-level schemas--the prototype conceptualization of teaching--are characterized as language-oriented (the teachers), performance-oriented (Joey's mother), activity-oriented (Kyle's mother), and child-oriented (Tony's mother). For the teachers, what all the professional knowledge eventually boils down to is a two-in-one concern: how to improve children's auditory and verbal abilities. While interacting with a child, resorting to all the techniques and strategies at the back of their mind, the teachers' thoughts were entirely anchored on applying the Auditory-Verbal approach to the ongoing interactions to help the child learn. In other words, the prototype conceptualization of the teachers' mental processes was centered on the notion of developing children's auditory and verbal abilities surrounded by the techniques and strategies that realize it. In contrast, the notions that the mothers gravitated toward while interacting with their children were related to what they think they need to do to help their children learn the most effectively and efficiently. For Joey's mother, the thought that dominated her teaching mind was "how to let Joey learn as much and as effectively as possible"; therefore, imitation, correction, and full concentration were the core features of the prototype. For Kyle 's mother, the prototype of the teaching mind centered on "how to stimulate Kyle's reasoning ability in natural interactions". Q & A interactions, modeling correct answers, and conducting various activities were the core features. Finally, for Tony's mother, the prototype of the teaching mind centered on "how to seize the moment to input language expressions for Tony to listen to and learn". Around it, the core features consist of observing Tony's behavior, incessantly input language expressions, and pleasant interactions. These prototypical schemas not only identify the core of different people's reasoning processes, more importantly, they point out the driving forces that shape people's efforts and set the tone for perceiving interactions.

Comparison of Middle-Level Schema

The comparison of the teachers' and mothers' middle-level schemas, i.e., attitudes and values, reveals the following differences.

1. Meaningful interaction: There was a consensus belief among participants that language teaching is meaningful only when children pay attention to it. However, the approaches of getting their attention onto the target language objects varied significantly. The teachers and Tony's mother used rewards to trade for children's attention and cooperation, whereas Joey's mother and Kyle's mother usually resorted to demanding or warning. Such a difference is derived from two assumptions of teaching: (a) teaching is to capitalize on any learning opportunity that the child's attention allows; and (b) teaching is to dictate the desirable learning behaviors that the child should enact.
2. Expectations: The teachers based their expectations for children on their current abilities and took other developmental factors into account. Kyle's mother based her expectations on what she thought to be reasonable for children of Kyle's age to accomplish. Joey's mother based her expectations on what she thought to be necessary for Joey to achieve. Tony's mother closely follows the teacher's lead and based her expectations on the progress that Tony made in learning each individual language target.

3. Pleasant learning interactions: The teachers and Tony's mother believe that fun and learning can and should go hand in hand, whereas Joey's mother and Kyle's mother would rather separate the two and concentrate on the learning outcomes while in lessons. For Joey's mother, nothing was more important than getting Joey ready for school. She would do anything to push and help Joey improve his language ability, having fun excluded.
4. Productivity in contrast to effectiveness of learning: The mothers shared the same goal of making every lesson as productive as possible; the difference was how to accomplish it. For Joey's mother, being productive means getting more accurate responses from Joey, so she would keep correcting and pushing him until he gave a correct response; for Tony's mother it means striving for more opportunities for conducting verbal interactions with Tony, so she would never stop talking while she was with Tony; and for Kyle's mother, it means more cognitive stimulations for Kyle, so she would constantly ask Kyle questions. The teachers, on the other hand, look for effectiveness besides productivity. The effectiveness that they look for is a good-quality learning process that naturally brings out good learning outcomes in a pleasant and natural learning atmosphere.
5. Time pressure: All of the mothers shared the same eagerness to help their children to learn as fast as possible. In one way or another, they expressed their fear that time with their children was too precious to be wasted on things that do not have direct impact on their children's learning. The teachers empathized with such stress and anxiety, but those emotions were not evidenced in the way they taught in the therapy sessions or interviews. Most of the time, what concerned the teachers was whether or not the child had made progress over time. In contrast, what concerned the mothers was whether or not their children were going to be fine in a mainstreamed school.
6. Begin with approaches in contrast to begin with children: The teachers rooted their thinking about teaching on the teaching approaches and tailored them to meet individual child's learning needs, whereas the mothers began with their assumptions of their children's learning propensities and customized the teaching approaches for their children. The difference is that the former may lose sight on the mismatch between teaching approaches and children's learning behaviors, whereas the later may preclude the children from new effective learning experiences.
7. Professional knowledge in contrast to experience: When the mothers' experiences were at odds with the teachers' professional knowledge, the teachers' advice was often disregarded. It was observed that the mothers were more open to advice regarding technical aspects of the approach which may generate more observable effects such as strategies for stimulating children's speaking and listening abilities than conceptual aspects, such as principles for shaping children's behaviors. Especially when the mothers felt their approaches had led to a certain reasonable success in the past, it was hard for them to take the teachers' advice to their hearts.
8. Natural interactions: While teachers believed that learning naturally accumulates in normal-yet-language-targets-focused interactions, the mothers did not entirely trust the processes, or at least did not regard it as enough. The didactic nature derived from their own educational experiences often led the mothers to address the learning duties that the children had to fulfill during casual interactions. That is, in addition to normal exchanges of language, the mothers expect more specific learning outcomes and emphasize learning efforts such as memorization from the children.

Comparison of Local-Level Schemas

The local-level schemas, represented by networks of teaching actions, were broken down to sub-networks that represent different parts of the entire teaching procedure. Teaching behaviors and the patterns of their relations are compared between the teachers' and the mothers' schemas.

1. Before lessons begin: The atmosphere and settings of the CHF environment are designed to elicit the best learning performance from children. Having come to the therapy sessions for at least a year, the children knew what was going to happen and how they were expected to behave in sessions; therefore they were usually more psychologically prepared for the teachers' activities. In contrast, it was more difficult for the mothers to wait and seize the children's motivated moments and squeezed in language-focused interactions on a twenty-four hours basis. Therefore, sometimes the mothers had to acquire the children's attention by more forceful way.

2. Provide verbal stimuli: Once an activity was chosen, the interactions usually began with a verbal stimulus. Two differences were observed in the way that the teachers and mothers presented the verbal stimuli by the Auditory-Verbal approach. First, given their trust and acceptance of the approach, the mothers did not exercise it as proficient as the teachers did. The reason may be due to negligence or implicit resistance to certain techniques (e.g., a mother said "I didn't provide reinforcers because children need to learn to study independently whether having a reinforcer or not). Second, the teachers have a lot more flexibility in changing materials or activities than the mothers. This is because that the teachers have more teaching resources than the mothers while the mothers have more predetermined teaching objectives for the lessons.
3. Problem-solving processes: Believing that children need to learn to solve problems by themselves, the teachers often intentionally brought children into a problem-bound situation, in which the teachers facilitated the thinking process and carefully associated children's problem-solving behaviors with language. This effort was not observed in the mothers' teaching schema. The mothers either predicted the consequence of children's actions to keep children from making mistakes or told them what to do right after the problem occurred.
4. Incorrect response: The three mothers demonstrated three styles of handling their children's inabilities to respond to stimuli. Joey's mother accepted nothing but accurate responses; therefore, regardless of Joey's motivation level, she would keep asking Joey to try until he could respond correctly. Kyle's mother preferred natural interactions, so she would add only one or two extra clues and then disclosed the correct response quickly. Tony's mother primarily concerned about inputting language expressions for Tony to listen to and learn; therefore, instead of correcting his mistake, she would follow his reaction and verbally describe his response for him. On the other hand, the teachers would break down the stimulus, add extra clues, or repeat the stimulus to help the child understand. Meanwhile, they always checked on the children's motivation levels to avoid building any association between adverse emotions and learning.
5. Non-verbal response: When the children gave non-verbal responses, the teachers and Joey's mother would try to help the children respond verbally. Kyle's mother usually did not notice the difference. She would accept non-verbal responses and comment on the accuracy of the responses. Tony's mother would help Tony to respond verbally only when he had demonstrated the ability of saying it correctly in the past.
6. Intelligibility check and imitation: Upon receiving a verbal response from a child, the teachers and mothers had to check its intelligibility to decide if an imitation was needed. Joey's mother always asked Joey to imitate the accurate words or phrases repetitively until he did it right. Tony's mother only asked Tony to imitate when she knew that he had done it before. Kyle's mother did not ask for imitation very often, but when she did, she would correct her children's tongue positions in addition to having the children listen and imitate. The teachers would ask children to imitate only when children were ready to do it, and only do a few rounds of practice to avoid stressing children out. In addition, visual cues were used when nothing else worked and would be taken away immediately after the pronunciation was correctly made.
7. Reinforcement, expansion, feedback, and turn-taking: All of the participants believed in the effectiveness of reinforcement, so they more or less would give children rewards or compliments when they performed well. The feedback that the teachers and Tony's mother provided in reaction to the child's response included repeating the child's responses and providing evaluation on its accuracy in a positive way. Joey's mother and Kyle's mother usually provided only judgment. With the possible exception of Kyle's mother, all participants wuold try to expand the children's language whenever possible. Turn-taking was a technique that the mothers seldom apply at home.

Comparison of Propositional Reasoning Processes

In order to reveal the differences between the teachers' and the mothers' mental models in detail, each of the three mothers' propositional reasoning processes is compared individually to the teachers'.

Joey's Mother and the Teacher:

1) Academic oriented in contrast to language oriented: If Joey's mother/teachers want to help Joey to keep up with other children in school,
   a) Joey's mother will teach him the academic materials in advance.
   b) The teachers will focus on helping him to establish good language ability first.

2) Push for maximum performance in contrast to leading into best performance: If Joey's mother/teachers want to help Joey learn as much as possible,
   a) Joey's mother will keep talking to him, correct every mistake he makes, and keep pushing for a good imitation until he gets it right.
   b) The teachers will provide motivators to stimulate his learning interests, and conduct language-focused interactions in designed activities or normal daily communications.
3) Demand him to do it right in contrast to help him to do it right: If Joey gives an incorrect response but Joey's mother/teachers believe Joey can and want to help him respond to the question correctly,
   a) Joey's mother will feel unacceptable, raise her voice to demand his full attention, repeat the same question, and be reluctant to provide more clues because she does not like to lower the standard.
   b) The teachers will reexamine his standing in the course of language development and rephrase or provide more clues to help him respond correctly.
4) Make the child to learn effectively in contrast to look for effective teaching for the child: If Joey's mother/teachers want to help Joey to learn effectively,
   a) The mother will create a serious learning atmosphere and demand complete concentration to make him take learning seriously to learn effectively.
   b) The teachers will identify where his attention is at and present prioritized language-focused interactions in a meaningful way to either attract the child's attention or to follow it.
5) Ignore distraction in contrast to capitalize on distraction: If Joey's mother/teachers want to help Joey learn as much as possible but are disrupted by an unexpected incident in a lesson,
   a) Joey's mother will consider the incident as a distraction, and will ignore it and bring Joey's attention back to the planned lesson as soon as possible.
   b) The teachers will capitalize on the incident and associate it with corresponding language expressions.
6) Eliminate the negatives in contrast to capitalize on the positives: If Joey's mother/teachers want to help Joey learn from the mistake he made,
   a) The mother will incessantly correct any mistake he made and resort to punishment to keep him from making the same mistake again.
   b) The teachers will emphasize the correct part of the response, associate it with the desired response, or directly model the correct response when such association does not work.
7) Model solution in contrast to guide thinking processes: If Joey's mother/teachers want to help Joey to learn how to solve a problem,
   a) Joey's mother will verbally or physically model the solution for him to imitate and learn, and expect him to memorize it.
   b) The teachers will provide more visual or verbal cues to help him understand the problem and facilitate the thinking process to guide him to solve the problem successfully.

Kyle's Mother and the Teacher

1) Activity-oriented in contrast to language-oriented: If Kyle's mother/teachers want to help Kyle learn through an activity,
   a) Kyle's mother will primarily focus on the activity itself and try to generate successful outcomes out of it.
   b) The teachers will try to create relationships among people, objects, or the surroundings in the activity to demonstrate different language features.
2) Reading in contrast to meaningful interactions: If Kyle's mother/teachers want to help Kyle learn different language expressions,
   a) Kyle's mother will teach by reading books.
   b) The teachers will associate the language expressions with Kyle's personal experiences
3) Quantity of interactions in contrast to quality of interactions: If Kyle's mother/teachers want to improve Kyle's general language abilities,
   a) Kyle's mother will conduct more language interactions with him to compensate for her relatively unfocused language interactions.
   b) The teachers will conduct language-targets-focused language interactions with him and expose him to an environment abundant with reasonably advanced language features.
4) Make transition to the future in contrast to do what is working now: If Kyle's mother/teachers want to get Kyle to learn,
   a) Kyle's mother will provide no motivators other than verbal encouragement because that is what happens in schools.

b) The teachers will either present a motivator in advance or provide reinforcers afterward to elicit good learning behaviors.

5) Memorization in contrast to comprehension: If Kyle's mother/teachers want to teach Kyle a new concept,
   a) Kyle's mother will describe it for Kyle to listen to and have him memorize it.
   b) The teachers will provide more visual or verbal cues to bridge the gap between the stimulus and the child's cognitive level, and facilitate the thinking process to guide the child to comprehend successfully.
6) Memorization in contrast to role playing: If Kyle's mother/teachers want to help Kyle learn different language expressions related to different roles,
   a) Kyle's mother will model the expressions for him to memorize and hope that he practices on his brother.
   b) The teachers will have the child play different roles and help him learn the language expressions associated with those roles.
7) Warning and punishment in contrast to enticing motivation: If Kyle's mother/teachers want to get Kyle to concentrate on the lesson,
   a) Kyle's mother will warn him and let him know that she will be mad if he does not behave.
   b) The teachers will provide motivators or change to a more interesting activity.
8) Combination of approaches in contrast to Auditory-Verbal approach only: If Kyle's mother wants to help her children make an accurate pronunciation,
   a) Kyle's mother will model the correct pronunciation and its basic elements for him to imitate first, and then correct his tongue position.
   b) The teachers will help him learn to make accurate pronunciation by associating the sound they modeled for him with the sound he made.

Tony's Mother and the Teacher

1) Need to know the child's progress in contrast to trust the processes: If Tony's mother/teachers want to design activities for Tony to learn something,
   a) Tony's mother will design activities that begin with commands or questions for him to respond to test how well he understands her.
   b) The teachers will present abundant language expressions in accordance with his language capabilities to establish his habit of listening.
2) Language learning with top priority in contrast to language learning grounded in integrated child education: If Tony's mother/teachers want to keep Tony staying in an activities so he can learn,
   a) Tony's mother will keep him from feeling frustrated, tolerate poor manners of learning, and allow him to have more rewards than he deserves so he will enjoy the activities.
   b) The teachers will teach him how to deal with frustration, fairness, and accept no inappropriate behaviors.
3) Ride on his inappropriate response in contrast to insist the right way to respond: If Tony's mother/teachers want to help Tony learn when he intentionally ignore the accurate response and responding to stimuli the way he wants,
   a) Tony's mother will forget about the stimuli and tries to associate his incorrect response with corresponding language expressions instead.
   b) The teachers will first make sure the stimulus has been clearly presented, and second, make sure he learn and demonstrate the association between the stimulus and its appropriate response correctly at least once.

Discussion

While the global-level schema describes the context-free prototype conceptualization of teaching, middle-level schema represents participants' general values about teaching, local-level schema describes the context-specific teaching procedures, and propositional reasoning represents the cognitive computations behind each teaching behavior. Based on this four-level framework, the comparison of three teachers' and three mothers' mental models reveals striking differences. Given the fact that the teachers and the mothers shared the same goal, i.e., to help their children to learn language as effectively and efficiently as possible, and that they all highly value the importance of the Auditory-Verbal approach for their children, what these differences show is that training is not about delivering knowledge but about transforming a cognitive system. If such transformation takes place only at local-level schema, e.g., learning the techniques of the Auditory-Verbal approach but not the attitudes toward the nature of children's learning, the newly learned will be interpreted in accordance with the existing value systems, and the outcomes of such training will often be different than the trainers would have expected. Oftentimes, what

matters to a child's learning experiences is not how accurate a teacher or mother can execute a teaching technique, but the subtle facial expressions, pace, tone of speech, bodily language that reflect a person's fundamental attitudes that are conveyed through executing these techniques. While training a subject matter whose application is inseparable of personal attitudes and subjective-decision making, understanding how the subject matter is mentally represented is crucial for the success of the training.

Furthermore, all the descriptions of the teachers' and the mothers' lower level schemas should be viewed in the perspectives of higher level schemas. On the other hand, propositional reasoning, although demonstrated as closely attached to a particular unit behavior, is actually operated on the basis of the whole schema system. Therefore, this four-level framework represent four aspects of the internal representations that we construct for comprehending the encountered entites in an integrated yet dynamic format.

Finally, the comparison outcomes show that, comparing to the mothers, the teachers are more process-oriented, flexible yet prepared, and fun-driven. They believe in enhancing the positive performance and adjusting their approaches to deal with children's lack of progress or learing motivations. With these teaching inclinations as the platform for the langauge-oriented prototypical teaching mind, which sets the direction for cognitivly processing interactions, all the thinking and teaching behaviors gravitate toward building children's auditory and verbal abilities in the way in accordance with Auditory-Verbal approach. On the other hand, the mothers are more outcome/performance-driven, and goal-minded. Joey's mother's performance-oriented teaching mind results in a error-eliminating, negativly reinforcing, highly controlling type of teaching style, which concerns mainly about how accurate Joey's responses are and how serious that Joey's learning attitude is. Kyle's mother's activity-oriented teaching mind result in an activity-abundant yet language-unfocused teaching style, which compensate for less skillfully conducted interactions by increasing the quantity of interactions. On the other hand, Tony's mother's child-oriented teaching mind generates a fun-loving, encouraging, everything-for-langauge-interactions style, which weighs eliciliting Tony's learning motivation over many other equally important developmental concerns. What these differences indicate is that people conceptualize the task of teaching in different ways. They value different aspects or outcomes of teaching, and thus are more open to information that is based on the same predispositions of teaching. Developed from their personal learning experiences, expectations, or maternally instincts, these teaching predispositions constitute the personally-defined optimal teaching package that they believe is for their children. It not only takes a lot of mutual understanding and empathy to make clear what the differences really are about, it also takes a lot of acclimatization to do something different from what they have accustomed to do.

Revealing these background knowledeg-rooted internal representations of teaching is to improve the mutual understanding between teachers and parents. Especially in special education where parents' teaching efforts are crucial for children's development, when the mothers' perceptions of teaching are intricately intertwined with parental expectations, responsibilities, feelings of guilt, and attitudes toward the child's handicap, teachers' unawareness of these background issues may result in totally off-the-mark interactions between teachers and parents. A study of three teachers and three mothers does not bear too much generalization contribution. However, the intricacy and the integrity of mental models could not be demonstrated with reasonable power of representativeness if no lengthy and in-depth qualitative data collection and analysis procedures are conducted. This study intends to propose a framework for representing mental models, and to build three teachers' and three mothers' teaching models as a window for understanding how teaching is conceived during teaching. The next step is to take these information as a given and figure out the way of promoting the effectiveness of interactions between teachers' and parents' models.

References

Anderson, J. R. (1993). Rules of the mind. Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Anthony, G. (1994). Learning strategies in the mathematics classroom: What can we learn from stimulated recall interviews? New Zealand Journal of Educational Studies, 29(2), 127-140.

Auditory-Verbal International (1991). Auditory Verbal position statement, The Auricle, 4(4), 11, 15.

Bartlett, F. C. (1932). Remembering. Scientia, 52, 221-226.

Brewer, W. F. (1987). Schemas versus mental models in human memory. In P. Morris (Ed.), Modelling cognition (pp. 187-197). New York: John Wiley & Sons Ltd.

Bryan, T., Bay, M., Shelden, C., & Simon, J. (1990). Teachers' and at-risk students' stimulated recall of instruction. Exceptionality, 1(3), 167-179.

Clark, C. M., & Peterson, P. L. (1986). Teachers' thought process. In M. C. Wittrock (Ed.), Handbook of research on teaching (3rd ed.) (pp. 255-296). NY: MacMillan Publishing Company.

Driscoll, M. P. (1994). Psychology of learning for instruction. Boston: Allyn and Bacon.

Dutke, S. (1996). Generic and generative knowledge: Memory schemata in the construction of mental models. In W. Battmann and S. Dutke (Eds.), Processes of the molar regulation of behavior (pp. 35-54). Lengerich: Pabst Science Publishers.

Greeno, J. G. (1989). Situations, mental models, and generative knowledge. In D. Klahr & K. Kotovsky (Eds.), Complex information processing. The impact of Herbert A. Simon (pp. 285-318). Hillsdale, NJ: Erlbaum.

Hampton, J. (1991). The combination of prototype concepts. In P. J. Schwanenflugel (Ed.), The psychology of word meanings (pp. 91-116). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Hong, E., & O'Neil, H. F. Jr. (1992). Instructional Strategies to help learners build relevant mental models in inferential statistics. Journal of Educational Psychology, 84(2), 150-159.

Johnson-Laird, P. N. (1983). Mental models. Cambridge, Massachusetts: Harvard University Press.

Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). Taxonomy of Educational Objectives, Handbook II: Affective Domain. New York: David McKay Company, INC.

Lincoln, Y. S., & Guba, E. G. (1985). Naturalistic Inquiry. California, Beverly Hills: Sage Publications.

Medin, D. L., & Schaffer, M. M. (1978). Context theory of classification learning. Psychological Review, 85(3), 207-238.

Minsky, M. (1975). A framework for representing knowledge. In P. H. Winston (Ed.), The psychology of computer vision (pp. 211-277). New York: McGraw-Hill.

Norman, D. A. (1983). Some observations on mental models. In D. Gentner, & A. L. Stevens (Eds.) Mental models (pp. 7-14). Hillsdale, New Jersey: Lawrence Erlbaum Associates.

Rogoff, B., Ellis, S., & Gardner, W. (1984). Adjustment of adult-child instruction according to child's age and task. Developmental Psychology, 20, 193-199.

Rouse, W. B., & Morris, N. M. (1986). On looking into the black box: Prospects and limits in the search for mental models. Psychological Bulletin, 100(3), 349-363.

Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), Theoretical issues in reading comprehension (pp. 33-58). Hillsdale, NJ: Erlbaum.

Sanford, A. J., & Moxey, L. M. (1999). What are mental models made of? In G. Rickheit & C. Habel (Eds.). Mental models in discourse processing and reasoning, (pp 57-76). Amsterdam: North-Holland.

Van Noord, R. W. & Kagan, N. (1976). Stimulated recall and affect simulation in counseling: Client growth reexamined. Journal of Counseling Psychology, 23(1), 28-33.

Wertsch, J. V., Minick, N., & Arns, F. J. (1984). The creation of context in joint problem solving: A cross-cultural study. In B. Rogoff & J. Lave (Eds.), Everyday cognition, (pp. 151-171). Cambridge, Mass: Harvard University ress.

Wilson, J. R., & Rutherford, A. (1989). Mental models: theory and application in human factors. Human Factors, 31(6), 617-634.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").